CLAIMS

1. Process for extracting a geological horizon and related properties from a seismic representation, in which there is constructed a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic functions of a multidimensional seismic matrix, said function being designated as a "continuous local seismic trace", comprising the following steps:

a). using as optimum (vertical) offset of two adjacent continuous local seismic traces, the value of offset rendering the maximum their correlation function, this optimum offset being not necessarily a whole number multiple of the vertical sampling interval;

b). taking as conditional neighborhood a central continuous local seismic trace $S_{ij,k}(t)$, the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c). constructing a two-dimensional extraction matrix adapted to be filled with extracted points belonging to the same horizon as the one passing through the seed point;

d). selecting a seed point $P(i,j,t)$ and determining the point $P(i,j,k)$ of the three-dimensional seismic matrix that is vertically closest;

e). estimating the properties associated with the conditional neighborhood and filling the two-dimensional extraction matrix with properties offset by translation of the current variable (t) of the optimum offset value $(h_{ij,pq,k})$ corresponding to the vertically nearest point (i,j,k).

14

2. Process according to claim 1, in which there is used as the seed point of step d) all the new points stored in the two-dimensional matrix of step b) and not yet used as grain points.

3. Process according to claim 1 or 2, in which the content of the two-dimensional matrix of step c) is successively filled in the course of successive extraction repetitions.

4. Process according to claim 1 or 2, in which the content of the two-dimensional matrix of step c) is successively replaced by a mean of the successive contents in the course of successive extraction repetitions.

5. Process according to claim 1 or 2, in which the property of the extracted subsurface is an assembly of seismic attributes calculated at each extraction point on the horizon passing through the seed point, the computation of these attributes being itself carried out simultaneously with the extraction of these points.

6. Process according to claim 1 or claim 5, in which there is visualized along a visualization screen the seismic attributes painted on the extracted horizon.

7. Device for practicing the process according to any one of claims 1 to 4, comprising means to use as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximum their correlation function, means to take as conditional neighborhood of a

reference central continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1, means to construct a two-dimensional extraction matrix adapted to be filled with extracted values, means to select a seed point $P(i,j,t)$ and to determine the point $P(i,j,k)$ that is vertically closest, and means to estimate the related properties of the conditional neighborhood and to fill the two-dimensional extraction matrix with properties offset by translation of the current variable (t) of the value of the optimum offset $(h_{ij,pq,k})$ corresponding to the vertically nearest point (i,j,k).

8. Device according to claim 7, comprising memorization means and visualization means for the seismic parameters determined with the help of the process according to any one of claims 1 to 6.

9. Computer program, comprising elements for program code to execute the steps of the process according to any one of claims 1 to 5, when said program is executed with a computer.

10. Computer software, comprising program code elements to execute the steps of the process according to claim 6, when said program is executed by a computer.